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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 3] [1922

XIV.—A REVISION OF AMOREUXIA.

T. A. Sprague.

The small family *Cochlospermeae* was proposed in 1847 by Planchon* for the reception of two genera *Cochlospermum* and *Amoreuxia*, which had previously been referred to the *Malvaceae*, *Ternstroemiaceae*, *Cistaceae* and other families. Bentham included these genera in *Bixineae*, tribe *Bixeae*,† and Warburg, who treated the *Bixeae* as an independent family, *Bixaceae*, proposed the new tribe *Maximilianeae*, for their accommodation.‡ They were removed from the *Bixaceae* (sensu stricto) in 1897 by Engler, who restored the group to family rank as *Cochlospermaceae*, mainly on account of the presence of oil instead of starch in the food reserves of the seed.§ Van Tieghem also regarded the group as an independent family.‖

Cochlospermum includes at least 15 species, natives of tropical and subtropical America, Africa, Asia and Australia, the head-quarters of the genus being in tropical America. *Amoreuxia*, on the other hand, is confined to tropical and subtropical America. *Cochlospermum* has a uniloculár ovary, and uniform stamens, whereas *Amoreuxia* has a trilocular ovary, and two sets of stamens on opposite sides of the flower, one with long and the other with short filaments. This makes the flower noticeably zygomorphic.

The genus *Amoreuxia* was dedicated by Mociño and Sessé to a Montpellier botanist, P. J. Amoreux, and was published by A. P. De Candolle in 1825.¶ It was based on one of an extensive series of coloured drawings intended to illustrate Mociño and Sessé's unpublished Flora of Mexico, and is known only from De Candolle's description, and a coloured copy of

* Hook. Lond. Journ. Bot. vi. p. 139 (1847); Ann. Sc. Nat. sér. 4, xvii. p. 90 (1862).

† Benth. et Hook. f. Gen. Pl. i. p. 122 (1862).

‡ Engl. et Prantl, Pflanzenfam. iii. 6, p. 310 (1895).

§ Engl. et Prantl, Pflanzenfam. Nachtr. p. 251 (1897).

‖ Journ. de Bot. 1900, xiv. pp. 32–54.

¶ DC. Prodr. ii. p. 638 (1825).

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the original drawing preserved in the Candollean Herbarium, and reproduced in the form of a tracing by Alphonse De Candolle in 1874.*

It is not known where the type species, *Amoreuxia palmatifida* was collected: "Sessé and Mociño spent eight years, from 1795 to 1804, in the botanical exploration of Mexico and the adjoining countries, from Punta Arenas in Costa Rica to the mouth of the river Hiaqui or Yaqui in north-western Mexico."†

In 1830 Schlechtendal and Chamisso based a new genus and species, *Euryanthe Schiedeana*, on specimens collected by Schiede and Deppe between Manantial and Paso de Ovejas during a journey from Vera Cruz to Jalapa.‡ *Euryanthe* was reduced to *Amoreuxia* by Planchon in 1847.§ Planchon was at first inclined to reduce *E. Schiedeana* to *A. palmatifida*,‖ but eventually decided to treat them as separate species. Under the new combination *Amoreuxia Schiedeana* he quoted (1) Schiede's specimens, which he had not seen, and the synonym *Euryanthe Schiedeana*; (2) Coulter's No. 789 from Sonora Alta, Mexico; (3) specimens collected by Purdie at Ibagué in Colombia. The plate illustrating his paper was drawn from the Colombian material.

Five years later Asa Gray¶ referred to *A. Schiedeana* specimens collected by Charles Wright (No. 79) on prairies near the San Pedro River, Western Texas. In the following year, Gray based a new species, *A. Wrightii*, on Wright's Texas material, and applied the name *A. Schiedeana* to specimens collected in Sonora, Mexico, by Wright (No. 916) and Coulter.** The diagnostic characters of the two species were as follows :—

A. Schiedeana. Leaves 7–9-partite, with spathulate segments. Capsule 1 inch long. Seeds reniform.—Sonora, Vera Cruz, Colombia.

A. Wrightii. Leaves 5- or sub-7-partite, with obovate segments, cuneate into the base. Capsule 1½–2 inches long. Seeds obovoid.—Western Texas, Nuevo Leon (Monterey).

Gray accepted the geographical distribution ascribed to *A. Schiedeana* by Planchon, and cited *A. palmatifida*, D.C. as being possibly synonymous; he subsequently adopted the name *A. palmatifida* for the species, and treated *A. Schiedeana* as a synonym.††

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* Calques Dess. Fl. Mex. Moc. Sessé, t. 1171 (1874).

† Hemsl. Biol. Centr.-Amer., Bot. iv. p. 120 (1887).

‡ Linnaea, v. p. 224 (1830). Both here and in Schiede's account of his journey (l.c. iv. p. 211, l. 3; 1829), the locality is misprinted "Marantial." A good map of the route between Vera Cruz and Xalapa was given by Humboldt, Atlas Geogr. Mex. t. 9.

§ Hook. Lond. Journ. Bot. vi. p. 139 1847).

‖ l.c. t. 1.

¶ Pl. Wright. i. p. 29 (1852).

** Pl. Wright. ii. p. 26 (1853).

†† A. Gray, Syn. Fl. N. Am. ed. Robinson i. part 1, p. 207 (1895).

The subsequent discovery of *A. Wrightii* at Tantoyuca by Ervendberg extended the known distribution of that species southwards to the Mexican province of Vera Cruz.*

Hemsley considered that *A. Schiedeana*, Planch. was certainly the same as the original *A. palmatifida*.† He enumerated *A. Wrightii* in addition to *A. palmatifida*, but cited under the latter species Eaton and Edwards' specimens from Monterey, Nuevo Leon, and Parry's No. 37, collected on the way from San Luis Potosi to San Antonio, Texas. These should be referred to *A. Wrightii*, as Sereno Watson shortly afterwards pointed out.‡

Three species of *Amoreuxia* were generally recognized in 1895.§ Van Tieghem added a fourth in 1900, which differed from those previously described in its trilobed leaves and anthers opening by a single terminal pore instead of by two.‖ The accepted synonymy and distribution of the four species was as follows :—

1. **A. palmatifida,** *Moc. et Sessé.—A. Schiedeana*, Planch. *Euryanthe Schiedeana*, Cham. et Schlecht.
DISTRIB. Arizona, Sonora, Vera Cruz, Colombia.

2. **A. Wrightii,** *A. Gray.*
DISTRIB. S. W. Texas to Arizona, Nuevo Leon, Tamaulipas, Vera Cruz.

3. **A. malvaefolia,** *A. Gray.*
DISTRIB. Chihuahua.

4. **A. unipora,** *Van Tiegh.*
DISTRIB. Bolivia.

The anomalous geographical distribution ascribed to *A. palmatifida* attracted the writer's attention. It seemed improbable that a species found once only in Central Colombia, about 4° 27′ N., should be identical with one whose nearest known locality was in Vera Cruz 15° further north. A critical examination of the material of *Amoreuxia* in the Kew Herbarium and in the British Museum (Nat. Hist.) resulted in the recognition of five distinct species, apart from *A. unipora*, which is unrepresented, and *A. Schiedeana*, which is imperfectly known.

The seeds are so characteristic that each species may be distinguished by them alone (*see* Plate I.). Additional diagnostic characters may be drawn from the shape of the leaves; the flowers, on the other hand, seem relatively uniform. The five species are the three described by Asa Gray under the names *A. Schiedeana* (*palmatifida*), *A. Wrightii* and *A. malvaefolia*, and two new ones, *A. Gonzalezii*, from Sinaloa, and *A. colombiana*, collected by Purdie in Colombia.

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* A. Gray in Proc. Amer. Acad. v. p. 176 (1862).
† Biol. Centr.-Amer. Bot. i. p. 56 (1879).
‡ Proc. Amer. Acad. xvii. p. 324 (1882).
§ A. Gray Syn. Fl. N. Am. ed. Robinson, i. part 1, p. 207 (1895).
‖ Journ. de Bot. 1900, xiv. p. 48.

The specimens which served as the type of Gray's description of *A. Schiedeana* (*palmatifida*)* were gathered by Charles Wright in northern Sonora. The same species was subsequently recorded from Arizona.† As might have been expected from the geographical distribution, it is not conspecific with *Euryanthe Schiedeana* (Vera Cruz), a co-type of which is preserved in the Botanical Department of the British Museum. Mature seeds of *E. Schiedeana* are unfortunately not known, but the shape of the leaf-segments seems to indicate a relationship with *A. Wrightii*.

The identification of Wright's Sonora specimens with *A. palmatifida*, Moc. et Sessé, appears to be better founded. Mociño and Sessé's drawing is not very characteristic, but the shape of the leaf-segments of the right-hand leaf lends support to Gray's identification. Moreover, A. P. De Candolle cited under *A. palmatifida*‡ a specimen from the Herbarium of Ruiz and Pavon, then in Lambert's Herbarium and now at the British Museum;§ and this specimen matches Thurber's No. 708, and Wright's No. 916, both from Sonora, the latter being the type of Gray's *palmatifida*.

Seven species of *Amoreuxia* may accordingly be recognised: *A. palmatifida*, Moc. et Sessé, *A. Schiedeana* (Cham. et Schlecht.), *A. Wrightii*, A. Gray, *A. malvaefolia*, A. Gray, *A. unipora*, Van Tiegh., and two new ones, *A. colombiana*, from Ibagué, Colombia, and *A. Gonzalezii*, from northern Sinaloa. Additional species may possibly be represented by specimens collected by Palmer (No. 176) at Guaymas, Sonora, and by Rose (No. 1624) between Rosario and Colomas, Sinaloa. These were distributed as *Amoreuxia palmatifida*, but differ from that species in the shape of the leaf-segments. It seems undesirable to describe them as new species, however, until the capsules and seeds are known.

Amoreuxia, *Moc. et Sessé ex DC.* in DC. Prodr. ii. p. 638 (1825); Endl. Gen. p. 1250 (1840); Planch. in Hook. Lond. Journ. Bot. vi. p. 140, t. l. (1847); Benth. in Journ. Linn. Soc., Bot. v. Suppl. 2, p. 79 (1861); Triana et Planch. in Ann. Sc. Nat. sér. 4. xvii. p. 92 (1862); Benth. et Hook. f. Gen. Pl. i. p. 124 (1862); Baillon in Adansonia, x. p. 259 (1872); Dict. Bot. i. p. 152 (1876); Warb. in Engl. et Prantl, Pflanzenfam. iii. 6, p. 313 (1895); A. Gray, Syn. Fl. N. Am. ed. Robinson, i. part 1, p. 206 (1895); Van Tiegh. in Journ. de Bot. 1900, xiv. p. 46.

Euryanthe, Cham. et Schlecht. in Linnaea, v. p. 224 (1830).

Cochlospermum, Baillon, Hist. Pl. iv. pp. 289, 321 (1873), pro parte.

Low undershrubs. *Stems* erect, simple or slightly branched, 1·5–4 dm. high, arising from a stout, tuberous or woody root-

* Pl. Wright. ii. p. 26 (1853).
† A. Gray, Syn. Fl. N. Am. ed. Robinson, i. part 1, p. 207 (1895).
‡ DC. Prodr. ii. p. 638 (1825).
§ Hist. Coll. Nat. Hist. Dep Brit. Mus. i. pp 161, 178 (1904).

stock. *Leaves* alternate, stipulate, long-petioled, suborbicular in outline, cordate at the base, palmatipartite or palmatifid; segments or lobes serrate (leaves rarely trilobed with crenulate lobes); mesophyll marked, especially on the lower surface, with irregular brownish dots and dashes due to the presence of resin-cells; stipules subulate, conspicuous. *Flowers* large, arranged in a terminal raceme, sometimes in both terminal and axillary racemes. *Sepals* 5, oblong-lanceolate, tardily deciduous. *Petals* 5, obovate, yellow, orange or reddish, contorted in the bud. *Stamens* numerous, in two sets on opposite sides of the flower, one with long and the other with shorter filaments; filaments filiform; anthers linear, basifixed, dithecous, opening by two short terminal slits or pores (rarely by a single terminal pore). *Ovary* subglobose, finely and densely pubescent, trilocular, placentation axile; style undivided, stigma punctiform; ovules numerous, biseriate, campylotropous or amphitropous. *Capsule* large, pendulous, oblong-avoid or ellipsoid, loculicidal; pericarp splitting into a thinly coriaceous epicarp and a membranous endocarp. *Seeds* large, globose, obovoid or reniform, albuminous; testa divided into a thin outer layer (arillode) which forms a loose or closely adherent outer envelope at maturity, and a thick, dark, smooth, lustrous and crustaceous inner layer, perforated by a well-marked chalazal orifice. *Embryo* large, more or less curved; cotyledons large and thin; albumen fleshy, oleaginous.—Species 6–7, natives of the south-western United States (Arizona and S.W. Texas), Mexico (Sonora, Sinaloa, Chihuahua, Coahuila, Nuevo Leon, Tamaulipas, Vera Cruz), Colombia (Tolima) and Bolivia (Santa Cruz).

Type species: *A. palmatifida*, Moc. et Sessé.

Key to the Species.

Leaves 3-lobed, lobes crenulate; anther opening by a single terminal pore - - - - - - 7. *unipora*.

Leaves 5–9-lobed, lobes serrate; anther opening by two short terminal slits or pores:

Seeds not reniform; arillode loosely fitting; rhaphe linear:

Seeds globose; arillode pilose - - 1. *Gonzalezii*.

Seeds oblong-obovoid, flattened on one side in profile; arillode glabrous - - - 2. *Wrightii*.

Seeds reniform; arillode closely appressed; rhaphe very broad:

Leaves very shortly lobed, lobes subtruncate; seed broadly reniform with a wide shallow sinus; arillode shortly setulose - - - 3. *malvaefolia*.

Leaves very deeply lobed:

Seeds with a wide shallow sinus; arillode shortly and rather densely pilose - - 4. *colombiana*.

Seeds with a narrow deep sinus; arillode sparingly setulose - - - - 5. *palmatifida*.

Imperfectly known species - - - 6. *Schiedeana*.

Some of the most important specific characters being derived from the seed, it is difficult to determine several of the species in a flowering condition. The following key based on leaf-characters may be of assistance in such cases. At the same time it should be pointed out that the lobing and serration of the leaves appears to be less constant than the shape and indumentum of the seeds.

ADDITIONAL KEY.

Leaves very shortly lobed - - - 3. *malvaefolia*.
Leaves deeply lobed :
Leaves trilobed, lobes crenulate; anther opening by a single pore - - - - - - 7. *unipora*.
Leaves typically 5-lobed, lobes obovate, serrate; anther opening by two pores - - - 2. *Wrightii*.
Leaves typically 7–9-lobed, lobes serrate; anther opening by two pores :
Lobes more or less oblanceolate, gradually narrowed downwards from above the middle :
Lobes subtruncate or rounded - 5. *palmatifida*.
Lobes pointed - - - 1. *Gonzalezii*.
Lobes obovate or subspathulate :
Lobes subspathulate, serrate in the upper half, entire in the lower (Mexican species) - 6. *Schiedeana*.
Lobes oblong-obovate, serrate in the upper three-quarters, entire towards the base (Colombian species) - - - - 4. *colombiana*.

1. **A. Gonzalezii,** *Sprague et Riley*, sp. nov.

Caules 3–3·5 dm. alti, pilis crispulis breviter pubescentes. *Folia* usque ad 4–6 mm. supra basin profunde 5–7-partita, segmento medio maximo, ceteris gradatim minoribus, extimis minimis subintegris; segmenta oblanceolata, acuta vel obtusa, puperne grosse irregulariter serrata, a medio vel altius usque ad basin cuneato-angustata, integra; mesophyllum punctis lineolisque brunneis plus minusve pellucidis in facie inferiore magis obviis notatum; petioli, ut nervi subtus, crispule pilosi, folia ceterum glabra. *Flores* desunt. *Capsula* oblongo-ellipsoidea, 4·5–5·5 cm. longa; valvae 1–1·5 cm. latae, grosse pubescentes. *Semina* globosa, sine arillodio vix 4 mm. diametro; arillodium molliter pilosum.

VERNACULAR NAME.—Zaya.

MEXICO.—Sinaloa: Choix; Cerro del Muerto, 620 m., *J. Gonzalez Ortega* 897 (type in Herb. Kew.).

Dedicated to Señor J. Gonzalez Ortega, to whom the Kew Herbarium is indebted for a collection of dried plants from various localities in Sinaloa and Tepic. Distinguished by its globose seeds, with a loosely fitting, softly pilose arillode. The shape of the leaf-segments is also characteristic.

2. **A. Wrightii,** *A. Gray,* Pl. Wright. ii. p. 26 (1853); A. Gray in Proc. Amer. Acad. v. p. 176 (1862); Hemsl. Biol. Centr.-Amer., Bot. i. p. 56 (1879); S. Wats. in Proc. Amer. Acad. xvii. p. 324 (1882); Coult. in Contrib. U.S. Nat. Herb. ii. p. 26 (1891); Britton et Kearney in Trans. N.Y. Acad. Sc. xiv. p. 36 (1894) (Contrib. Herb. Columb. Coll. No. 71); A. Gray, Syn. Fl. N. Am. i. part 1, p. 207 (1895); Havard in Bull. Torr. Bot. Cl. xxii. p. 111 (1895). *A. Scheideana,* [sic] A. Gray. Pl. Wright. i. p. 29, t. 3B (1852), excl. syn., non *A. Schiedeana,* A. Gray l.c. ii. p. 26 (1853). *A. palmatifida,* Hemsl. Biol. Centr.-Amer. Bot. i. p. 55 (1879), partim.

S.E. Arizona. Fort Huachuca, *Wilcox* (fide Britton et Kearney, l.c.).

S.W. Texas. Prairies near the San Pedro River, fr. July, *Wright* 79 (co-types in Herb. Kew. et Mus. Brit.); Laredo, Rio Grande River, *Palmer* 58 (Herb. Kew.)

Coahuila. El Toro, near Movano, fl. July, *C. A. Purpus,* 4465 (Mus. Brit.).

Nuevo Leon. Monterey, *Eaton and Edwards* 76 (Herb. Kew.); Monterey, on rocky hills, fl. June, *Pringle* 1881 (Herb. Kew. et Mus. Brit.)

Tamaulipas. Between San Fernando and Crucillas, fl. April, *Berlandier* 3118 (Herb. Kew.)

Vera Cruz. Tantoyuca, *Ervendberg* 124 (fide A. Gray in Proc. Amer. Acad. v. p. 176; 1862).

Also collected, without precise locality, en route from San Luis Potosi to San Antonio, Texas, *Parry* 37 (Herb. Kew. et Mus. Brit.). I have seen no specimens of *A. Wrightii* from Arizona or Sonora. S. Watson stated that the specimens collected in Sonora by Thurber belonged to this species. Thurber's No. 708 from Santa Cruz Valley, Sonora (Herb. Kew.), was collected in a flowering state, but I have no hesitation in referring it, in the absence of seeds, to *A. palmatifida,* on account of the number and shape of the leaf segments. In Gray's Synoptical Flora, Thurber's specimen is cited under *A. Wrightii,* but with a mark of interrogation.

As *A. Wrightii* apparently occurs neither in New Mexico* nor in Sonora, the Arizona locality recorded by Britton and Kearney seems to be isolated from the main area occupied by the species. Confirmation of the record is desirable. According to Havard (l.c.) the roots of *A. Wrightii* are greedily devoured by peccaries and other animals.

3. **A. malvaefolia,** *A. Gray,* Pl. Wright. i. p. 29 (1852), in adnot.

Chihuahua. Without precise locality, *Scheer's collector* (type in Herb. Kew.); volcanic hills and mesas near Chihuahua, fl.

* No species of *Amoreuxia* is recorded for New Mexico by Wooton and Standley (Contrib. U.S. Nat. Herb. xix.; 1915).

Sept., *Pringle* 1569 (Mus. Brit.); rocky mesas near Chihuahua, fr. Aug., *Pringle* 1189 (Herb. Kew.).

4. **A. colombiana,** *Sprague,* sp. nov.

Caules 2·2–3·2 dm. alti, pilis crispulis breviter pubescentes. *Folia* usque ad 5–13 mm. supra basin profunde 7-partita, segmento medio maximo, ceteris gradatim minoribus, extimis interdum lobulo integro extra supra basin instructis; segmenta obovata vel subspathulata, apice rotundata, parte basali brevi marginibus parallelis integris usque ad 1 cm. lata, ceterum grosse subdupliciter serrata; petioli, ut nervi subtus, crispule pilosi, folia ceterum glabra; mesophyllum punctis lineolisque brunneis irregularibus in facie inferiore inconspicue notatum. *Inflorescentia* et sepala extra dense pubescentia. *Capsula* ovoidea, acuta, 4·5 cm. longa, in statu applanato 3 cm. lata; valvae circiter 1·5 cm. latae, minute pubescentes. *Semina* late reniformia, 5–5·5 mm. longa, medio 2·5 mm. lato, sinu lato aperto; arillodium breviter dense pilosum.——*A. Schiedeana,* Planch in Hook. Lond. Journ. Bot. vi. p. 140, excl. syn. et stirp. mexican.; Triana et Planch. Prodr. p. 92 (1862). *A. palmatifida,* Planch. l.c. t. 1, non Moc. et Sessé.

Colombia. Tolima: plains of Ibagué, fl. and fr. May, *Purdie* (type in Herb. Kew.).

5. **A. palmatifida,** *Moc. et Sessé ex DC.* in DC. Prodr. ii. p. 638 (1825); Planch. in Hook. Lond. Journ. Bot. vi. p. 141 (1847); Alph. DC. Calques Dess. Fl. Mex. Moc. Sessé, t. 1171 (1874); Hemsl. Biol. Centr.-Amer., Bot. i. p. 55 (1879), excl. syn. et specim. nonnull.; A. Gray, Syn. Fl. N. Am. ed Robinson, i. part 1, p. 207 (1895), excl. syn.; Havard in Bull. Torr. Bot. Cl. xxii. p. 111 (1895).

A. Schiedeana, A. Gray. Pl. Wright. ii. p. 26 (1853), excl. syn. et specim. novogranatens.

Vernacular Name. Sayas (fide *Havard,* l.c.)

Arizona. (Fide *A. Gray,* l.c.; 1895).

Sonora. Northern Sonora: hills along mountain streams near Rancho Desierto, fr. Sept., *Wright* 916 (Herb. Kew. et Mus. Brit.); Santa Cruz Valley, *Thurber* 708 (Herb. Kew.). Sonora Alta, *Coulter* 789 (Herb. Kew.).

Also represented from Mexico without locality by a specimen in *Herb. Pavon* (Mus. Brit.), which was cited by De Candolle. Palmer's No. 176 (Herb. Kew. et Mus. Brit.) from Guaymas, Sonora, has very coarsely serrate leaf-segments approximating in shape to those of *A. Wrightii.* Rose's No. 1624 from between Rosario and Colomas, Sinaloa, has equally coarse serration, and the mesophyll is conspicuously marked on the lower surface with irregular brown dots and dashes due to the presence of resin. These two numbers were distributed as *A. palmatifida,* but the identification will remain in doubt until seeds are known.

Palmer's No. 176 was identified by S. Watson with *A. palmatifida.** According to Palmer, the plant is known by the vernacular name "Sayas" and the roots, which have the taste of the parsnip and carrot, are eaten by the Yaqui Indians, and made into a preserve by the Mexicans.

According to Havard (l.c.) the roots of *A. palmatifida* when roasted have the taste of the parsnip and carrot, and are eaten by the Papago and Pimo Indians as well as by the Mexicans under the name of "Sayas."

6. **A. Schiedeana,** *Sprague.—Euryanthe Schiedeana,* Cham. et Schlecht. in Linnaea, v. p. 225 (1830).

Vera Cruz. On the way from the town of Vera Cruz to Jalapa, between Manantial and Paso de Ovejas, fl. Aug., *Schiede* (co-type in Mus. Brit.).

Planchon cannot be quoted as the authority for the combination *A. Schiedeana,* inasmuch as the plant which he described and figured under that name belongs to a different species, *A. colombiana,* and the only other specimen seen by him (*Coulter* 789) is referable to a third species, *A. palmatifida.* Nor can Asa Gray be cited as the authority, since the two species which he identified with *Euryanthe Schiedeana* were *A. Wrightii* and *A. palmatifida.* The name *A. Schiedeana,* Planch. is therefore treated as a "nomen delendum" and the combination *A. Schiedeana* is made *de novo.*†

7. **A. unipora,** *Van Tiegh.* in Journ. de Bot. 1900, xiv. p. 48.

Bolivia. Santa Cruz: Santiago de Chiquitos, *Orbigny* 915 (Herb. Paris. ex Van Tiegh. l.c.).

Known to me only from Van Tieghem's brief description. It differs from all the other known species by its anthers, which dehisce by means of a single pore instead of by two. If it is really an *Amoreuxia,* we have an interesting case of parallelism between this genus and *Cochlospermum: Cochlospermum* subgen. *Eucochlospermum* Planch.‡ has anthers which dehisce by a single pore; whereas in subgen. *Diporandra,* Planch.§ the anthers open by two pores.

Explanation of Plate

(Seeds of *Amoreuxia.*)

Fig. 1.—*A. Gonzalezii.*
Fig. 2.—*A. Wrightii.*
Fig. 3.—*A. malvaefolia.*
Fig. 4.—*A. colombiana.*
Fig. 5.—*A. palmatifida.*

Three views of each seed: A, arillode removed, showing chalazal orifice (above) and hilum; B, showing arillode, hilum (below) and raphe; C, arillode removed, profile view.—All magnified × 8¾.

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* Proc. Amer. Acad. xxiv. p. 40 (1889).
† Vide Sprague in Journ. Bot. 1921, p. 156, No. 7
‡ Hook. Lond. Journ. Bot. vi. p. 306 (1847).
§ l c. 310.

XV.—RIGIOLEPIS AND OTHER VACCINIACEAE OF BORNEO.

H. N. Ridley.

The genus *Rigiolepis* was founded by J. D. Hooker on *R. borneensis* figured and described in Hooker's Icones Plantarum, t. 1160. This is an epiphytic climbing shrub with a tuberous root and stiff, thick coriaceous triplinerved leaves; the very short racemes are usually extra-axillary, hairy, with ovate coriaceous bracts and a pair of similar but smaller bracteoles just beneath the flower.

The flowers are very small and crowded, about 40 in a raceme 3 to 4 cm. long. The calyx-lobes are rigid, acute, light yellowish green, becoming yellow after the fall of the corolla, which is little longer than the sepals, nearly globose, about 2 mm. long and white. There are 10 stamens with the filaments shorter than the anthers, and a pair of horns from the connective on the back. The fruit is unknown.

It appears to be confined to the forests on the slopes of Mount Matang in Sarawak, Borneo, where it has been collected by Lobb, Haviland (no. 1020), Hullett and myself (no. 12292).

Several botanists have reduced the genus to *Vaccinium*, but in its epiphytic habit, extra-axillary racemes, and very small flowers, it is so different from typical species of *Vaccinium* that I should be unwilling to include it in that genus; if referred to *Vaccinium*, however, it and the following new species should be placed in a distinct subgenus.

By some curious error Merrill has reduced *Rigiolepis borneensis* to *Vaccinium acuminatissimum*, Miq., with which it has nothing in common.* W. W. Smith described it as *Vaccinium borneense*, without recognising it as the original *Rigiolepis borneensis*.†

Rigiolepis lancifolia, *Ridley*, sp. nov.; affinis *R. borneensi*, Hook. fil., sed ramis virgatis, foliis anguste lanceolatis acuminatis basi rotundatis; racemis axillaribus; sepalis majoribus, corolla paullo longiore, stigmate pulvinato.

Frutex epiphyticus (?), ramis gracilibus, apicibus pubescentibus. *Folia* remota, anguste lanceolata, obtusa, basi rotundata, 3–6 cm. longa, 7–10 mm. lata, coriacea; costa supra depressa, subtus hirta; nervi intramarginales tenuissimi, a basi costae orti; nervuli laterales plurimi, curvi; petiolus crassus, hirtus, 2 mm. longus. *Inflorescentiae* axillares, racemosae, perulatae, perulis lanceolatis acuminatis hirtis; racemi densi, hirti, 5–10 mm. longi. *Bracteae* ovato-lanceolatae, coriaceae, hirtae, costatae, 3 mm. longae. *Pedicelli* breves, crassi. *Calyx* turbinatus, hirtus, lobis 5 lanceolatis acutis coriaceis. *Corolla*

* Journ. Roy. As. Soc., Straits Branch, Special Number, 1921, p. 465.
† Notes Bot. Gard. Edin. viii. 329 ("1915").

vix longior, ovoidea, extus hirta. *Stamina* 10, filamentis brevissimis crassis; antherae filamentis longiores, superne angustatae, tubis terminalibus brevibus, cornubus duobus in dorse e connectivo ortis quam antherae multo brevioribus. *Stylus* crassus, corollae aequilongus, stigmate pulvinari.

Borneo. Sarawak; near Quop. *Haviland* 619 (Herb. Kew.); Mount Start, on limestone, 540 m., *Haviland* 1462 (Herb. Kew.).

Rigiolepis Lobbii, *Ridley*, sp. nov.: frutex epiphyticus, glaber, pedalis (*Lobb*) foliis elliptico-lanceolatis acuminatis, interdum praeter nervos intramarginales conspicuos nervis submarginalibus praeditis, racemis extra-axillaribus 5-floris.

Frutex epiphyticus, pedalis (teste *Lobb*), ramis gracilibus glabris. *Folia* elliptico-lanceolata, acuminata, obtusa, in basin breviter angustata, 3.5 cm. longa, 1.2 cm. lata, coriacea, glabra; costa supra elevata sed in sulco depressa; nervi intramarginales conspicui, a basi costae orti, nervis submarginalibus tenuissimis obscuris interdum additis; nervuli transversi plurimi, ramulosi; petiolus 1 mm. longus. *Racemi* extra-axillares, 5 mm. longi, 5-flori. *Bracteae* ovato-lanceolatae, costatae, hirtae; bracteolae ad basin floris 2. *Calyx* hirtus lobis 5 lanceolatis. *Corolla* a me non visa, (teste *Lobb*) alba. *Bacca* ovoidea, hirta, 7 mm. longa, calycis lobis erectis coronata.

Borneo. Sarawak; 900 m., *Lobb* (Herb. Kew.).

The single specimen is incomplete: it differs from *R. lancifolia* in the shorter, broader leaves, often showing an indistinct submarginal nerve in addition to the conspicuous intramarginal one.

Vaccinium sulcatum, *Ridley*, sp. nov.; arbuscula ramis validulis, foliis rigide coriaceis, nervis superne depressis subtus prominentibus; racemis in axillis fasciculatim congestis elongatis, floribus dissitis, bracteis parvis; corolla mediocri urceolata; baccis hirtis 10-locularibus: *V. acuminatissimo*, Miq., affinis, sed foliis majoribus.

Arbuscula, ramis juvenibus hirtis. *Folia* rigide coriacea, elliptico-ovata, breviter cuspidata, basi rotundata vel in basin breviter angustata, auriculis 2 parvulis ad petiolum, 9–17 cm. longa, 4–7 cm. lata, supra nitida, utrinque costa et nervis demum exceptis hirtula vel glabrescentia; lamina valde quintuplinervis, nervis exterioribus a basi, interioribus paullo superius ortis, nervis intramarginalibus gracilioribus sed conspicuis additis, nervulis transversis pluribus undulatis; petiolus crassus, 5 mm. latus, 5 mm. longus. *Inflorescentiae* axillares, perulis lanceolatis acuminatis; racemi 4 intra perulas orti, fasciculatim congesti, graciles, hirti, 4 cm. longi, 12–14-flori. *Flores* remoti, pedicellis gracilibus hirtis 5 mm. longis. *Bracteae* parvae, ovatae, longe acuminato-cuspidatae, hirtae. *Calyx* brevis, lobis 5 ovatis acutis. *Corolla* urceolata, glabra, pallide flava, lobis 5 brevibus ovatis recurvis. *Stamina* 10, filamentis gracilibus longis hirtis; antherae conicae basibus crassis rotundatis, tubis terminalibus brevibus,

cornubus 2 in dorso brevibus. *Stylus* elongatus, corollae aequilongus, haud incrassatus ad apicem. *Bacca* subglobosa, 4 mm. longa, hirta, 10-locularis, sepalis coronata. *Semina* linearia, complanata, curva.

Borneo. Sarawak; without precise locality, *Beccari* 3780; Niah, on limestone, *Haviland* and *Hose* 3466; near Kuching, *Haviland* 1625.

The foliage of this plant resembles closely that of *Rigiolepis borneensis*, Hook. fil., being thickly coriaceous, with nerves and reticulations sunk above and raised beneath, but the racemes are elongate, the bracts small and the corolla large, as in some species of *Vaccinium* notably *V. acuminatissimum*, Miq.

Vaccinium monanthum, *Ridley*, sp. nov.; *V. unifloro*, J. J. Sm., affinis, sed virgatum, floribus glabris.

Frutex ramis gracilibus virgatis, partibus juvenibus minute hirtis. *Folia* lanceolata, longe acuminata, basi rotundata vel in basin breviter angustata, 4–5.5 cm. longa, 1–1.5 cm. lata, coriacea; nervi intramarginales tenues sed conspicui, fere a basi costae orti, nervis submarginalibus basalibus brevibus inconspicuis additis; nervuli transversi ad 10, tenues, ramulosi et cum rete venularum in utraque pagina elevati (in sicco); petiolus 1 mm. longus. *Flores* singuli vel bini, axillares, glabri, minimi, e perulis orti; perulae minutae, lanceolatae, subulatae; pedicelli graciles, 3 mm. longi. *Bracteae* et bracteolae nullae. *Calyx* minimus, lobis 5 triangularibus ovatis tubo brevissimo longioribus. *Corolla* globosa, 2 mm. longa, dentibus 5 brevibus. *Stamina* 10, filamentis brevissimis; antherae quam filamenta multo longiores, lanceolatae, superne angustatae, cornubus 2 e dorso. *Stylus* longior, cylindricus.

Borneo. Sarawak: Niah; on limestone, *Haviland* and *Hose* 3465.

This species is allied to *V. uniflorum*, J. J. Smith in Ic. Bogor. t. 320. It differs in the shape of the foliage, and the completely glabrous flowers. *V. uniflorum* is a slender epiphyte but *V. monanthum* is a longer branched, twiggy plant, apparently not epiphytic.

These two species with their peculiar reduction of inflorescence to a single very small flower emitted from an axillary tuft of narrow perulae are so utterly unlike any other species of the genus *Vaccinium*, that it may eventually be necessary to propose a new genus for their reception.

XVI.—GARDEN NOTES ON NEW OR RARE TREES AND SHRUBS: XX.

W. J. Bean.

Aucuba chinensis, *Bentham*. [Cornaceae.]

For many years the only Aucubas in cultivation were the common *A. japonica* and its numerous forms, but during his earlier journeys in China on behalf of Messrs. Veitch, Mr. E. H. Wilson introduced this species to the Coombe Wood Nursery, whence it was obtained for Kew. Bentham first described it as long ago as 1861 in his "Flora Hongkongensis," p. 138. It is an evergreen shrub found up to 9 feet high in a wild state, with glabrous young shoots and leaves. The leaves appear to be very variable in shape; on the Kew plants they are oblong, acute, rounded to cuneate at the base, coarsely and irregularly dentate, of a greyer green and duller in hue than any of the forms of *A. japonica*, also thicker and stiffer in texture. Mr. Rehder in "Plantae Wilsonianae," Vol. ii. p. 572, describes two forms:—var. *obcordata* with obovate leaves tapering from a truncate apex to the cuneate base; and var. *angustifolia* with narrow, linear-lanceolate leaves up to 8 in. long and ½ to 1½ in. wide. The flowers of *A. chinensis* differ from those of *A. japonica* in the petals being longer and slenderly acuminate. The fruit is red, ovoid, about ½ in. long, produced in short globose panicles.

This shrub is a native of Western China, in the provinces of Hupeh, Yunnan and Szechuen, also of Hong Kong and Formosa. The Western Chinese forms have smaller leaves, fruits and panicles and are probably the hardier. But Wilson's plant is not hardy at Kew and it was much injured by the frosts of December, 1920. It will no doubt be hardy in the south-western counties and of value there for planting in deep shade. There is no large-leaved evergreen shrub so useful as *A. japonica* for providing an undergrowth up to 6 feet high beneath trees casting a dense shade.

Berberis Vernae, *Schneider*; syn. *B. Caroli* var. *hoanghensis*, Schneider. [Berberidaceae.]

This species was originally described by Schneider from specimens collected by the late W. Purdom in Western Kansu, China, but it was introduced to cultivation by E. H. Wilson, who found it in the Upper Min Valley, Western Szechuen, in 1910. It is his No. 4022, the seeds of which were distributed under the synonym given above. Mr. Schneider subsequently came to the conclusion that *B. Caroli* var. *hoanghensis* and *B. Vernae* were the same.

It is a deciduous shrub 6 to 10 ft. high, with glabrous, grooved young shoots, armed at the lower part with stiff three-pronged spines, ½ to 1⅛ in. long, reduced at the terminal flowering part of the shoot to a single, much smaller, needle-like spine. Leaves in fascicles of as many as eight, spathulate or oblanceolate, often quite entire, but occasionally with a few small slender teeth;

very variable in size in each fascicle, the smallest $\frac{1}{3}$ in. long, $\frac{1}{8}$ in. wide, the largest up to $1\frac{3}{4}$ in. long and $\frac{5}{8}$ in. wide; they are quite glabrous. Flowers bright yellow, small, $\frac{1}{6}$ in. wide, produced in April and May densely packed in pendulous racemes 1 to $1\frac{3}{4}$ in. long, $\frac{1}{3}$ in. wide. Fruit globose, $\frac{1}{5}$ in. wide, salmon red.

B. Vernae is a vigorous grower and evidently perfectly hardy. The small pendent racemes thickly packed with flowers are very distinct and give a graceful effect. At one place in China Wilson found this shrub used for forming hedges. The specific name was given in compliment to Miss Verna Berger, daughter of Mr. A. Berger, once of the La Mortola Garden, Ventimiglia.

Buddleia alternifolia, *Maximowicz.* [Loganiaceae.]

A deciduous shrub of very vigorous growth up to 10 or 12 feet high, making shoots several feet long during the summer and forming a widely branched, loose shrub as much through as it is high; young shoots at first covered with grey scurf, soon becoming glabrous; grey and glossy the second year. Leaves alternate, entire, lanceolate, $1\frac{1}{2}$ to 4 in. long, $\frac{1}{4}$ to $\frac{1}{2}$ in. wide, dark dull green above, glaucous beneath. Flowers produced in June from the previous year's growths, crowded in short-stalked clusters borne at the nodes. The corolla is bright lilac-purple, about $\frac{1}{3}$ in. long, the lower part a slender cylindrical tube dividing at the mouth into four lobes. Calyx tubular, $\frac{1}{8}$ in. long, four-lobed, glaucous and scurfy like the pedicels, which are about as long as the calyx.

Although described by Maximowicz as long ago as 1880, this was introduced as lately as 1916 from Kansu by Farrer and Purdom. Its most distinctive character is, of course, the alternate arrangement of the leaves, all the other cultivated species having opposite ones. It is an attractive shrub and flowers best when grown in the sunniest spots. The flowers are fragrant, but are more so in some other species. It thrives exceptionally well in Mr. Lionel de Rothschild's garden at Inchmery, on the Solent. It is propagated with the greatest ease by means of summer leafy cuttings.

Caryopteris tangutica, *Maximowicz.* [Verbenaceae.]

The genus *Caryopteris* has been known in gardens since 1844, when Fortune introduced *C. Mastacanthus* from China. This new species, *C. tangutica,* was introduced by the late Reginald Farrer about 1915 from Western Kansu. *C. Mastacanthus,* a beautiful and satisfactory shrub farther south and west, has not proved wholly hardy at Kew, although it is only during very hard winters that it is killed. It was found by Fortune near Canton, and as the climate of Western Kansu is probably colder, it is possible *C. tangutica* may turn out to be the hardier species. It was discovered in 1880 by the Russian traveller Przewalsky and is described as a bushy shrub 3 to 5 feet high, the semi-woody young stems as well as the undersurface of the leaves and the flowerstalks being covered with a close, grey indumentum. Leaves opposite, ovate, $\frac{3}{4}$ to $1\frac{1}{2}$ in. long, with usually four coarse,

rounded teeth at each side. Flowers crowded in terminal and axillary corymbs, each 1 to 1½ in. wide. Corolla ½ in. long, bright violet-blue, with four short lobes and one long, fringed one. The calyx has a campanulate base and five lanceolate lobes which are tipped with violet.

The species is allied to *C. Mastacanthus* but may be distinguished by the more deeply divided lip of its corolla and the more coarsely toothed leaves. Kew is indebted to Major F. C. Stern of Highdown, Goring-on-Sea, for some plants which flowered very prettily last September.

Evodia velutina, *Rehder and Wilson.* [Rutaceae.]

The Evodias are rather handsome small trees of the Rue family and are allied to *Phellodendron*, differing in having exposed axillary buds whereas in *Phellodendron* they are concealed by the base of the petiole. *E. velutina* is a tree 40 to 50 ft. high, its young shoots clothed with velvety down. The pinnate leaves are up to 10 in. long and composed of seven to eleven leaflets, which are oblong-lanceolate, acuminate, obliquely rounded at the base, dull green and downy above, paler and clothed with a thick velvety pubescence beneath. Flowers yellowish white, small and very numerous, produced in August in a cluster of compound umbels at and near the end of the current season's growths, the entire inflorescence being 6 or 7 in. long and wide; flowerstalks velvety. The individual flower is ⅛ in. wide, with narrowly oblong petals; calyx, ovary and the short, thick pedicel downy. Fruit ⅕ in. wide, purplish brown, downy, globose with a small beak. Seeds black and shining.

This species is very distinct from the other species in cultivation because of the velvety down on its younger parts. It was discovered and introduced by Wilson in 1908 (No. 994). He found it in one locality only in Western Szechuen. It first flowered in this country in the garden of Mr. C. J. Lucas at Warnham Court, Sussex, in August, 1918. It is evidently perfectly hardy at Kew.

Holboellia coriacea, *Diels.* [Lardizabalaceae.]

Until the introduction of this species, which was effected by Mr. E. H. Wilson in 1907, the genus was only represented in gardens by *H. latifolia*, an old garden plant from the Himalaya which has never been much of a success in the open air except in the milder parts of the country. At Kew it can only be satisfactorily grown in a cool greenhouse. This new species, however, is evidently much hardier and is growing vigorously on the walls at Kew; it flowered very freely there in April 1921.

It is a vigorous evergreen climber and although Wilson gives its height as three to five metres, it appears capable of growing very much higher. The leaves are trifoliolate, the leaflets oval or oblong-obovate, 2½ to 6 in. long, 1 to 3 in. wide (the middle one somewhat larger and longer-stalked than the two lateral ones), acuminate, rounded at the base, dark lustrous green,

leathery and quite glabrous. The main leafstalk is 1½ to 3½ in. long, the stalk of the leaflets ¼ to 1 in. long. Flowers unisexual, the males produced in a cluster of corymbs 3 or 4 in. wide at the end of short shoots of the previous year or in their leaf-axils; petals dull purple, oblong, ½ in. long, ⅛ in. wide; stamens with pale purple filaments scarcely longer than the anthers. Female flowers borne usually three or four together in corymbs springing from the lower leaf-axils of the young shoots, the peduncle being up to 6 in. long, pedicels 1 to 2 in. long. They are rather larger than the male flowers, the fleshy petals greenish white tinged with purple; styles three, erect, cylindrical, ¼ in. long.

The female flowers were dusted with pollen, but owing probably to several severe late frosts last spring, no fruit developed. It is described by Wilson as purple, oblong, about 2¼ in. long and ⅘ in. wide, the white pulp it contains being edible, rather sweet, but watery and insipid. Seeds jet black. As in many of the *Lardizabalaceae*, the fruits are the most conspicuous, interesting and ornamental feature of the plant. *H. coriacea* is readily distinguished from *H. latifolia* by the uniformly trifoliolate leaves; in the latter the leaves are often quinquefoliolate.

Leucopogon Fraseri, *A. Cunningham.* [Epacridaceae.]

At Kew and over the average climate of the British Isles, this is the only member of the Epacris family that can be grown in the open air. It is a native of New Zealand and according to Cheeseman is found there at altitudes up to 4,500 ft. A plant was obtained from Messrs. Cunningham and Fraser of Edinburgh, in 1911, which has grown ever since without protection and quite uninjured by cold.

It is a dwarf evergreen shrub only 3 to 6 in. high, forming a dense tuft of more or less erect, very slender, minutely pubescent stems, which when young are almost hidden by the leaves. Leaves sessile, alternate, overlapping each other, ⅛ to $\frac{3}{16}$ in. long, $\frac{1}{16}$ to $\frac{1}{12}$ in. wide, obovate-oblong, abruptly narrowed to a slender, bristle-like apex, dull green, minutely ciliate. Flowers very fragrant, solitary, produced in the leaf-axils in May and June. The corolla is a slender tube ⅜ in. long, pinkish white, hairy inside, with five short, triangular lobes. The four brown anthers are attached by very short filaments to the corolla tube. Style slender, pubescent. Fruit an oblong drupe, ⅓ in. long, orange yellow, juicy, sweet and edible.

Besides its habitats in New Zealand it has others on the summit of Mt. Wellington, Gippsland, Australia, and on the Hampshire Hills, Tasmania. It is by no means a showy plant, but it has botanical interest and makes a neat, low tuft for the Rock Garden. The hay-like scent of the Epacris-like flowers is also pleasing.

Meliosma pendens, *Rehder and Wilson.* [Sabiaceae.]

Of the several new species of *Meliosma* introduced from China, *M. pendens* is the most nearly related to *M. cuneifolia*. It is a deciduous shrub 10 to 16 ft. high, very similar in general aspect

to that species. The young shoots are purplish and hairy; the leaves obovate-elliptic, abruptly acuminate at the apex, cuneate at the base, sparingly toothed, 2 to 6 in. long, 1 to 2½ in. wide, dull green above with short scattered hairs and a bristly midrib, paler green beneath and more conspicuously hairy there, especially on the midrib and veins. The veins are in 12 to 20 pairs; petiole ¼ to ½ in. long. Panicles terminal, pendulous, 4 to 8 in. long, scarcely as wide, carrying many small, fragrant, white flowers each about ⅛ in. wide. Sepals five, roundish ovate, minutely ciliate; petals five, concave. Fruit globose, about the size of peppercorns, black when ripe.

Meliosma pendens was discovered during 1907 by Wilson in Western Hupeh, China, where it grows in woodlands at 3,000 to 4,000 ft. altitude. A plant was obtained from the Coombe Wood Nursery for Kew in 1913 and is evidently perfectly hardy. It has flowered a few times in July, but not so freely yet as *M. cuneifolia;* nor does it promise to grow quite so freely. Its chief attraction is the hawthorn-like fragrance of its flowers. From *M. cuneifolia* it is distinguished by its pendent, narrower panicles and by the absence of tufts of hairs in the vein-axils of the leaf—so conspicuous in that species.

Salix Matsudana, *Koidzumi.* [Salicaceae.]

The species and hybrids of willow exist in bewildering numbers, but the great majority of them are shrubs. Of genuine trees there are not many in cultivation, not so many at any rate as to preclude a welcome to this new species. It is a deciduous tree growing 40 ft. high and was introduced from China by the late W. Purdom, and from Korea by J. G. Jack, to the Arnold Arboretum, thence to Kew in 1913. Two trees are growing on the "Seven Sisters Lawn" near the fine *Quercus castanaefolia* and they promise to develop into elegant trees. At first minutely pubescent and yellowish, the slender young shoots become brownish grey and glabrous later. The leaves are linear, acuminate, 2 to 4 in. long, ½ to ⅝ in. wide, bright green above, glaucous beneath and glabrous. Both the trees at Kew are female, and their cylindrical flowerspikes about 1 in. long. The flower is sessile in the axil of an ovate bract two-thirds as long as the ovary which is ⅛ in. in length, glabrous, surmounted by a dark stigma. The male aments are described as ⅗ in. long, each flower having two stamens.

This willow is a native of the provinces of Kansu and Chi-li, but is generally cultivated in North China and probably in Korea. Wilson says it is "planted everywhere between Tientsin and Pekin." Its nearest ally is *Salix babylonica*, but its comparatively erect habit makes it quite distinct.

Tilia intonsa, *Wilson.* Syn. *T. tonsura,* Veitch. [Tiliaceae.]

This interesting and distinct new lime was discovered by Wilson in 1903 in Western Szechuen up to altitudes of 10,000 ft., and was introduced by him the same year to Messrs. Veitch's nursery at Coombe Wood. It was obtained for Kew in 1913

since when it has grown admirably and proved quite hardy. Wilson describes it as a tree up to 65 ft. high with a trunk occasionally 9 feet in girth. The young shoots are thickly clothed with hairs. Leaves ovate or roundish-ovate, deeply cordate at the base, contracted at the apex to a shortly acuminate tip, evenly and minutely serrate; they are from 3 to 4½ in. long, rather less wide, glabrous above except on the main nerves, covered with stellate pubescence beneath; petioles 1½ to 2¾ in. long, pubescent. Sepals ovate-lanceolate, ¼ in. long; petals oblong-lanceolate, ⅓ in. long, $\frac{1}{10}$ in. wide. Fruit ovoid, ⅜ in. long, distinctly five-ribbed.

Tilia intonsa is distinguished from all the other Chinese limes by its very hairy young branchlets. Other distinctive characters are the absence of tufts of pubescence from beneath the leaf in the axils of the chief veins, and the stellate form of the pubescence. The species was originally called "Tilia tonsura" by Messrs. Veitch and offered by them under that name in their catalogue of New Chinese Plants for 1913. It may still be grown as such in some gardens or under Wilson's seed number 1569, but it is not common.

XVII.—THE GENUS HEYWOODIA.

J. Hutchinson.

In his work* on the Forest Flora of Cape Colony, published in 1907, Mr. T. R. Sim described a striking new genus of *Euphorbiaceae* from South East Africa which he named in honour of Mr. A. W. Heywood, Conservator of Forests, Transkei. In describing this plant for the Flora Capensis the present writer had before him only very imperfect material, and in consequence the account given therein was somewhat inadequate. In revising the naming of the South African *Euphorbiaceae* for the National Herbarium, Pretoria, a fine series of specimens of this genus, preserved in the Forestry Herbarium of Cape Colony, has been seen, from which the following more complete and accurate description has been drawn up.

These specimens show a remarkable difference between the leaves of the seedlings and those of the flowering shoots. In the seedlings, one of which is shown in the text figure, most of the leaves are peltately attached about 1 cm. above the base, whilst on the flowering branches they are basally attached and are either cuneate or rarely shortly cordate. This condition is noted by Mr. C. C. Robertson, of the Forestry Department, who states that very few seedlings were seen. He also makes the interesting statement that the same kind of leaf was observed on an adventitious shoot. This fact seems to point to the peltate character being an ancestral type which is retained in the seedling and in adventitious shoots produced by injury or other causes, and that the basally attached leaf is an ecological condition not yet finally established. Peltate leaves are almost

* Sim, For. Fl. of Cape Colony, 326, pl. 140, fig. 1 (1907).

unknown in Tribe *Phyllantheae*, so that their occurrence in this distinct and somewhat isolated genus is remarkable. They are, however, a common feature of several genera of Tribe *Crotoneae*, well known examples being *Mallotus*, *Macaranga*, and *Ricinus*.

Heywoodia. *Sim*, For. Fl. Cape Col. 326, pl. 140, fig. 1; Hutchinson in Dyer, Fl. Cap. v. ii. 384.

Descript. emend.—*Flores* dioici. *Petala* adsunt. *Flores* ♂. *Sepala* 3, imbricata, rotundata, inaequalia, in petala sensim transita. *Petala* 5, quam sepala majora, imbricata, membranacea. *Discus* breviter cupularis, carnosus, margine irregulariter undulatus. *Stamina* intra discum inserta, 8–12, biseriata, exteriora libera, interiora basi circa ovarium rudimentarium trifidum minutum breviter connata; antherae 2-loculares, loculis distinctis parallelis ellipticis. *Flores* ♀ non visi. *Fructus* subsessiles, axillares, plerumque solitarii, depresso-quadrati, 4-loculares, in coccos 2-valves dissilientes demum loculicidale dehiscentes, exocarpio verrucoso tenui, endocarpio osseo stramineo 5–7-striato medio circiter 1 mm. crasso. *Semina* oblique ellipsoidea, crebre longitudinaliter striata. *Embryo* parvus, cotyledonibus transverse elliptico-rotundatis 2 mm. latis. *Endospermum* papyraceo-elasticum.—*Arbor* magna, sempervirens. *Folia* alterna, coriacea, integra, breviter petiolata, nervosa. *Flores* axillares, ♂ dense fasciculati, sessiles, ♀ solitarii vel subsolitarii, brevissime pedicellati.

Heywoodia lucens, *Sim*, l.c.; Hutchinson, l.c.

Arbor usque ad 17 m. alta; rami cortice cinereo obtecti, junioribus gracilibus obtuse angulatis vel subteretibus glabris. *Folia* late elliptica vel ovato-elliptica, plerumque basi cuneata rarius leviter cordata, apice sensim et obtuse acuminata, 6–12 cm. longa, 2·5–8·5 cm. lata, integra, rigide coriacea, utrinque glabra et nitida; nervi laterales intra marginem conjuncti et ramosi, a costa sub angulo 45°–60° abeuntes, venis laxis utrinque distinctis; petioli 0·5–2 cm. longi, supra canaliculati, glabri. *Flores* ♂ dense glomerati, glomerulis fere 1·5 cm. diametro; bracteae parvae, coriaceae. *Sepala* late ovato-orbicularia, subcoriacea, glabra, nitida. *Petala* orbicularia ad oblongo-elliptica, interiora apice rotundata et leviter crenulata, usque ad 2 mm. longa. *Discus* carnosus, circiter 0·5 mm. altus, crenulato-lobulatus, glaber. *Stamina* 8–12; filamenta glabra; antherae 1·5 mm. longae. *Ovarium rudimentarium* minutum, trifidum. *Fructus* circiter 1·5 cm. diametro, quadrangulares, sicco straminei et verrucosi. *Semina* circiter 8 mm. longa, brunnea.

South Africa. Transkei: Dwessa Forest, *Sim* 2594. Cwebe Forest, Elliotdale district, 19 Jan. 1916, seedling specimen, *C. C. Robertson* in S. Afr. For. Herb. 1852. Cwebe and Sasa Forests, in young fruit, S. Afr. For. Herb. 2408. Ntsubane Forest, ♂ fls. Sept. 1916, *G. Fraser* in S. Afr. For. Herb. 2071. Pondoland: Port St. John, in forest on river bank, 20 Dec. 1896, *E. E. Galpin* 3486; in fruit July and Oct. 1916, *P. T. Doran* in S. Afr. For. Herb. 1892; 2113. Pungwane Forest, ♂ fls. June, 1916, S. Afr. For. Herb. 1972.

FIG. 1.

HEYWOODIA LUCENS, Sim. 1, seedling; 2, flowering shoot; a, male flower with perianth removed; b, anther; c, fruit seen from above; d, valve of capsule from within; e, the same from outside.

XVIII.—DECADES KEWENSES

Plantarum Novarum in Herbario Horti Regii Conservatarum.

DECAS CV.

1041. **Indigofera rubro-violacea,** *Dunn* [Leguminosae–Indigoferae] *I. Gerardianae*, Wall., affinis, sed racemis pedunculatis habituque laxo distincta.

Frutex erectus, ramis elongatis gracilibus. *Folia* imparipinnata, 5–6 cm. longa; foliola 6–10-paria, oblongo-ovata, apice basique obtusa, mucronata, 0·8–1 cm. longa, utrinque tenuiter adpresse pubescentia, primo stipellata. *Racemi* foliis multo longiores, pedunculis 1·5–2 cm longis suffulti. *Flores* subsessiles, 0·9–1·1 cm. longi, rubro-violacei; bracteae filiformes, caducae. *Calyx* fere explanatus, 3 mm. longus, ut vexillum tenuiter sericeus; dentes ovato-caudati. *Vexillum* ovatum, 0·8–1 cm. longum, breviter unguiculatum, ungue vix 1 mm. longo. *Legumen* cylindricum vel subquadrangulare, acuminatum, glabrum.

India. Chamba State, *Robert Ellis*, 1880; Parthi, 2500 m. *R. N. Parker;* Kashmir, Mari, Aug. 1880, *A. P. Young* (Herb. Brit. Mus.). Cult. Hort. Kew; Hort. Glasnevin.

This species has long been in cultivation at Kew under the name *I. Gerardiana*. A very similar *Indigofera* of old cultivation in France was described by Ventenat in 1803 as *I. macrostachya* (Jard. Malm. t. 44). Both these species occur in Chamba, from which State excellent dried material has recently been received at Kew from Mr. R. N. Parker. All the Indigoferas of this group vary considerably in the number of leaflets and length of peduncles at different stages of their growth and offer few reliable characters for distinction in the herbarium.

1042. **Tanacetum Kennedyi,** *Dunn* [Compositae–Anthemideae] *T. nano*, C. B. Clarke, affinis, sed inflorescentia subsessili et involucri bracteis lineari-spathulatis differt.

Herba perennis, 2–4 cm. alta. *Radix* valida, longa, verticalis, 2–4 mm. crassa. *Folia* pinnata, parce sericea, segmentis ovatis acutis integris vel pauci-lobatis, basi in vaginam lineari-oblongam angustata, partem basalem caulis vestientia. *Caulis* 0 vel brevis, laxe lanatus. *Capitula* 10–12, in caput 3–4 cm. latum congesta, 7–8 mm diametro, subsessilia. *Involucrum* campanulatum, parce lanatum; bracteae multiseriatae, lineares, 5–6 mm. longae, 1 mm. latae, virides, versus apicem rotundatum dilatatum et latera margine angusto fusco scarioso cinctae. *Corolla* ♀ tubulosa, 5-dentata. *Antherae* inclusae, basi muticae. *Ovarium* glabrum; pappus 0; stylus tandem exsertus; stigmata obtusa.

Tibet. "Near Yerpa Monastery, 4342 m. in August. *Sorong Serpo.*" Kennedy's Tibetan Drug n. 13.

This plant was in a collection of 27 Tibetan drugs sent in 1921 to Messrs. Burroughs and Wellcome by Col. R. S. Kennedy, I.M.S., D.S.O., M.C., and submitted by them to Kew in the condition in which they arrived, i.e., small bundles of dry and very brittle plants. It has, however, been possible with care to restore the various species to a recognisable condition and even, as in this case, to make one the type of an undescribed species. As these plants are collected by Tibetans who visit localities near their homes as yet possibly unknown to Europeans and who collect moreover a mass of material with the fragments of fruit, and old and young leaves so valuable to the systematist, this small collection throws some light on the Autumn flora of Tibet.

The Royal Geographical Society informs us that there is a Ye-pa 24 miles north of Lhasa, and it is possibly from a monastery situated there that the plants came.

1043. **Pulicaria insignis,** *J. R. Drummond* MS. ex *Dunn;* [Compositae-Inuleae]; e sectione nova **Pentachaeta,** *Dunn,* pappi interioris setis 5 plumosis distincta; a speciebus caeteris asiaticis pappo differt.

Herba insignis, perennis, erecta vel adscendens, 10–15 cm. alta, omnino dense hirsuta. *Radix* valida, longa, verticalis, 5–8 mm. crassa, ramosa, multiceps; radicis apices molliter lanati. *Caulis* foliosus, 1–3-capitatus, basi lanuginosus, foliis radicalibus vestitus et vetustorum vestigiis cinctus. *Folia* integra; radicalia oblanceolata, acuta, 6–8 cm. longa, 1·5–2. cm. lata, in petiolum longe attenuata; caulina oblongo-ovata, acuta, sessilia, basi obtusa, semi-amplexicaulia. *Capitula* heterogama, radiata, 4–6 cm. lata, floribus in ambitu ♀ plurimis 1-seriatis, disci ☿ fertilibus; pedunculi laterales, breves. *Involucrum* late campanulatum; bracteae multiseriatae, lineares, acuminatae, 1·5–2 cm. longae, intimae scariosae, exteriores breviores. *Receptaculum* planum, foveolatum. *Corollae* radii ligulatae, 2–3 cm. longae, 1 mm. latae, patentes; stylorum rami complanati, obtusi; disci, ☿ tubulosae, 5-dentatae. *Antherae* inclusae, basi caudatae. *Achaenia* 2–2·5 mm. longa, costata, dense sericea. *Pappus* duplex; exterior e paleis 5 laceris 1 mm. longis, interior setis 5, 6 mm. longis plumosis.

Tibet. Gyantse Hills, 8. 7. 07. *H. M. Stewart:* Chaksam, Tsangpo Valley, 4310 m. 26. 9. 04, *Col. L. A. Waddell:* near Yerpa Monastery, N. of Lhasa, Aug. 1921, 4310 m., a Tibetan drug *Ming-chen-serpo,* comm. by *Col. R. S. Kennedy* 26.

As observed by Bentham (Benth. & Hook. f. Gen. Pl. ii. 335), *Pulicaria* hardly differs from *Inula* except in the nature of the pappus, the former has two series of hairs or scales, the latter only one. This species must for that reason be placed in *Pulicaria,* but the 5 plumose setae distinguish it from all other Asiatic species of that genus. As a section in *Pulicaria* it is equivalent in that respect to Jaubert & Spach's ten-plumed section *Decachaeta* (Jaub. & Spach Ill. Pl. Or. iv. 71, t. 344). It

seems therefore convenient to make it the type of a new section as above.

1044. **Ligustrum travancoricum,** *Gamble* [Oleaceae–Oleineae] *L. Roxburghii,* C. B. Clarke affinis quoad corollae tubus calyci aequalis sed panicula brevi depressa drupa ellipsoidea et foliis magis coriaceis differt.

Arbor parva, foliis persistentibus, ramulis eximie lenticellatis. *Folia* opposita, coriacea, glabra, lanceolata, apice acuminata saepe curvata, basi attenuata et in petiolum decurrentia, 5–7 cm. longa, 2–2·5 cm. lata, nervi primarii utrinque 5–6, breves, arcuatim juncti; petiolus conspicuus 1–1·5 cm. longus. *Flores* in paniculis brevibus supra complanatis, circiter 6–7 cm. longis, ad 10 cm. latis; pedunculus et rami glabri, pedicelli breves. *Calyx* campanulatus, truncatus, 1 mm. longus. *Corollae* tubus calyci aequalis: lobi patentes tubo paullo longiores. *Stamina* paullo exserta. *Drupa* ellipsoidea, 7·5 mm. longa, glabra.

Southern India. Travancore: Mutthu Kuli Vayal; 1500 m., *T. F. Bourdillon* 337, Oct. 4, 1894, also near Trevandrum, without number; Tinnevelly District, Mundanthviai to Karyar, *Herb. Madras* 12206, Sept. 17, 1915.

1045. **Toxocarpus Beddomei,** *Gamble* [Asclepiadaceae–Secamoneae] *T. Kleinii,* W. & A., affinis, foliis lanceolatis magis nervosis, calycis lobis brevioribus obtusis differt.

Frutex gracilis scandens, ramulis teretibus lenticellatis puberulis. *Folia* opposita, lanceolata vel elliptico-lanceolata, apice acuminata, basi cuneata, costa excepta glabra, 8–10 cm. longa, 3–4 cm. lata; costa paullo incrassata parce furfuracea praecipue ad basin, nervi primarii prominentes, utrinque 7–8, primarii recti deinde in nervum intra marginalem curvati, secundarii pauci, reticulatio obscura; petiolus 2–2·5 cm. longus, ferrugineo-villosus. *Flores* in cymis dichotomis axillaribus ferrugineo-villosis, 3–4 cm. longis paucifloris, alabastro longe conico 6–7 mm. longo lobis sinistrorsam obtegentibus, bracteolae ovatae minutae. *Calycis* lobi ovati, brevissimi, eglandulosi. *Corollae* tubus brevis, 2 mm. longus, intus villosus, lobi lineares, 5–6 mm. longi. *Corona* e lobis 5 oblongis obtusis, staminum columnae adnatis. *Staminum* columna brevis; antherae appendiculo minute fimbriato ornatae. *Stylus* gracilis, apice incrassatus, stigmate gracili recto. *Fructus* ignotus.

Southern India. Tinnevelly; Ahraymalai Hills, *Col. R. H. Beddome* in Herb. Madr.

1046. **Toxocarpus palghatensis,** *Gamble* [Asclepiadaceae–Secamoneae] *T. Roxburghii,* W. & A., quoad corona affinis sed foliis et floribus multo majoribus differt.

Frutex gracilis scandens, ramulis teretibus puberulis, altioribus et innovationibus fere nigro-pubescentibus. *Folia* opposita, elliptica vel elliptico-obovata, apice abrupte acuminata, basi obtusa vel aliquando cuneata, supra glabra, subtus ad costam

prope basin furfuraceo-villosa, 10–12 cm. longa, 4–5 cm. lata; costa lata, supra impressa; nervi primarii utrinque 6–7 recti, prope marginem solum in nervum intra-marginale inconspicuum juncti. *Flores* in cymis dichotomis axillaribus fere nigro-villosis 2–2·5 cm. longis paucifloris, alabastro conico 5–7 mm. longo, lobis sinistrorsum obtegentibus; bracteae et bracteolae ovatae, minutae. *Calycis* lobi oblongi, 1–2 mm. longi, minute glandulosi (?). *Corollae* tubus brevis, vix 2 mm. longus; lobi oblongi, conspicui, fere ad 1 cm. longi. *Corona* e lobis 5 brevibus acutis staminum columnae adnatis. *Staminum* columna brevis; antherae appendiculis minutis incurvatis ornatae. *Stylus* brevis in annulum incrassatus, stigmate brevi fere capitato. *Fructus* ignotus.

Southern India. Malabar: Palghat Hills; about 1000 m., *Col. R. H. Beddome* in Herb. Madr.

1047. **Brachystelma Bourneae,** *Gamble* [Asclepiadaceae–Ceropegieae] *B. maculato*, Hook. f., affinis sed major, corollae lobis fere 1 cm. longis, pilis purpureis patentibus vel retrorsis conspicue tectis; coronae processubus subulatis 1 mm. longis.

Herba erecta, tuberosa, tubere fusiformi, a 1 m. alta, caudice 3–4 mm. diametro. *Folia* linearia, 7–10 cm. longa, 2 mm. lata, opposita. *Flores* in cymis axillaribus sessilibus vel breviter pedunculatis 3-floris, pedicellis filiformibus 5–15 mm. longis, bracteolis minutis; alabastra conica, acuta, fere 1 cm. longa. *Calyx* 5-partitus; lobi 5 lineares, glabri, 2 mm. longi. *Corollae* tubus brevis, rotatus, albus, viridi-maculatus; lobi triangulari-lanceolati, apice torti, circiter 1 cm. longi, pilis purpureis patentibus vel retrorsis tecti; corona annularis, lobis subulatis 5, 1 mm. longis supra stamina inflexis. *Stamina* brevissima, obtusa; pollinia globosa, apicem versus pellucida, caudiculis brevissimis. *Styli* apex pentagonus. *Folliculus* ignotus.

Southern India. Madura District: Pulney Hills; on Kodaikanal Ghat and in Perumal and Vilpatti Valley, east slope, May 1898 and June 1899, *Sir A. G. and Lady Bourne*, 1020, 2751, 2752.

1048. **Brachystelma Rangacharii,** *Gamble* [Asclepiadaceae–Ceropegieae] species insignis, ab aliis speciebus indicis corollae lobis longis linearibus gradatim attenuatis intus lanitie albida tectis facile distinguenda.

Herba erecta, tuberosa, ad 80 cm. alta, glabra, caudice 2–3 mm. diametro. *Folia* linearia, 6–8 cm. longa, vix 2 mm. lata, verticillata (3 in verticillis). *Flores* in cymis umbelliformibus axillaribus sessilibus circiter 5, pedicellis filiformibus, 1 cm. longis, bracteolis multis minutis. *Calyx* 5-partitus; lobi 5 lanceolati, acuminati, glabri. *Corollae* tubus brevissime campanulatus; lobi lineares, erecti, 1–1·5 cm. longi, intus lanitie albida eximie tecti; corona annularis undulata, lobis subulatis 5 circiter 2 mm. longis glabris. *Stamina* brevissima, obtusa; pollinia globosa apicem versus pellucida, caudiculis brevissimis. *Styli* apex pentagonus, fere planus. *Folliculus* ignotus.

Southern India. Coimbatore District; Hassanur, Aug. 26. 1914, *K. Rangachari* in Herb. Madr. 10654.

1049. **Stereospermum angustifolium,** *Haines* [Bignoniaceae–Tecomeae]; species *Stereospermo chelonoidi* et *S. suaveolenti*, DC., affinis; ab utraque foliolorum forma indumentoque differt, ab illa corolla purpurea intus circa filamentorum basin sine squamis lanatis, ab hac fructu inter alios characteres etiam differt.

Arbor parva ramulis nodosis, foliis ramulorum apicibus confertis, rhachide pubescente. *Foliola* 7–9, oblonga vel lanceolato-oblonga, acuminata, 8–16 cm. longa, 3–5 cm. lata, infima autem saepissime minima, basi acuta vel subacuta, subtus pubescentia aut rarius glabra, nervis lateralibus utrinque 6–10 saepe rufis; petioluli 3–9 mm. longi, neque tantum tenues quam ei *S. chelonoidis*, DC., neque tantum crassi quam ei *S. suaveolentis*. *Panicula* laxa, brachiata, 12–25 cm. longa, pubescentia sed quam ea *S. suaveolentis* minus viscosa, ramulis ultimis 3-floris. *Flores* purpurei, 2–2·5 cm. longi. *Calyx* pubescens, 5–8 mm. longus, dentibus 3–6 brevibus apiculatis (praesertim in alabastro). *Corolla* extus glabra vel parce pilosa, intus antice dense villosa, postice glabra, circa filamentorum basin non lanata. *Stamina* glabra aut versus basin parce pilosa, antherarum thecis divaricatis. *Capsula* cylindrica, 30–45 cm. longa, 7–9 mm. diametro, interdum 4 lineis tenuibus longitudinalibus instructa, brunnea, dense lenticellata. *Semina* cum alis membranaceis 2·5–3·1 cm. longa, alis apicibus obtusis aut sublaceris.—*S. chelonoides*, var. *angustifolium*, Haines, Descr. List Trees, etc. Southern Circle, Centr. Prov. p. 169 (1916).

India. Central Provinces, *Haines* 3433; Province of Bihar & Orissa: Angul, *Haines* 4959; Sambalpur, *Haines*.

S. chelonoides of De Candolle does not appear to me to be the *Bignonia chelonoides* of Linnaeus filius. There is a specimen of the latter in the Linnean herbarium, named, according to Dr. Jackson, in the handwriting of the younger Linnaeus. It was collected by König in 1777 and Dr. Jackson kindly referred to a letter from König of the same date written from Tranquebar which leaves no doubt that it is a South Indian tree collected near that locality. It is a very pubescent or even hirsute plant with the young leaves tomentose whereas *S. chelonoides* according to De Candolle is glabrous. The shape of the leaflets is elliptic and caudate exactly as in *S. chelonoides*, DC. but there is an important difference in the petiolules being short and rather stout instead of slender and the panicle is closely pubescent not glabrous as in De Candolle's species. In the North Indian *Stereospermum tetragonum*, DC., united with *S. chelonoides*, DC., in the Flora of British India, the corolla has woolly scales at the base of the filaments and these also are present in *S. chelonoides*, DC., but they do not occur in our plant. Whether or not they are present in the Linnean *Bignonia chelonoides* could not be ascertained without dissection, but the general appearance

of the corolla and its indumentum is more like that of our plant and of *S. suaveolens* than of *S. chelonoides*, DC.

1050. **Premna calycina,** *Haines* [Verbenaceae–Viticeae] : species adhuc cum *P. barbata*, Wall., conjuncta, sed inter alia calyce magno venoso anthesi nec alte 4-lobato nec lobis angustis, etiam floribus majoribus, foliis glabrioribus magis dentatis differt.

Arbor parva, inermis, usque ad 10 m. alta, cortice pallido. *Folia* elliptico-oblonga, lanceolata vel ovata, rarius obovata, acuminata, plus minusve serrata vel dentata, 8–20 cm. longa, 4–11 cm. lata, glabra vel in nervis subtus puberula, basi rotundata, obtusa vel breviter cuneata, nervis lateralibus 4–6, quorum 1–2 prope basin, petiolis 1·5–4 cm. longis glabris, vel supra leviter pubescentibus. *Panicula* parva, terminalis, minute pubescens, corymbosa, 3–6 cm. diametro, bracteis minimis caducis. *Calyx* inflato-campanulatus, anthesi sub-bilabiatus, 2 mm. longus, parce glandulosus, labio superiore nunc perspicue 2-lobato lobis imbricatis rotundatis nunc subintegro, labio inferiore obscure 3-lobato; calyx fructifer 2·5 mm. longus latusque, insigniter venosus, alte 2-labiatus vel inaequaliter 2–5-lobatus. *Corolla* alba, 5–6 mm. longa, tubo 3 mm. longo, lobis 4 late-oblongis rotundatis, fauce villosa. *Stamina* exserta. *Stylus* minute 2-fidus. *Drupa* globosa, 3 mm. diametro, putamine verrucoso.

India. Bengal, Bihar and Orissa, and the Central Provinces, frequent.

Whereas *P. barbata*, Wall., is chiefly a species of the lower Himalaya and adjacent moister regions, *P. calycina* extends into the Peninsula. The typical *Premna barbata* (Wall. No. 1768) from Nepal has pubescent entire or very slightly toothed leaves though Clarke in Flora of British India iv, 579 appears to regard as typical the form with more toothed leaves and to class the sub-entire leaved form as a variety "anodon." The calyx of *P. barbata* is very little enlarged in fruit and the latter is often pyriform. Brandis (Forest Trees, p. 511) states under *P. barbata* "calyx lobes enlarged and ribbed in fruit." This remark no doubt is applied to his specimens from Singbhum and the Central Provinces which are *P calycina* mihi.

XIX.—NOTES ON CYPERACEAE. I.

(*Pycreus pumilus* and *Pycreus hyalinus.*)

W. B. Turrill.

An unfortunate question of nomenclature has arisen in connection with the writer's revision of North Indian *Cyperaceae* for Mr. J. F. Duthie's "Flora of the Upper Gangetic Plain," and it seems advisable to clear the matter up in a separate paper.

Following C. B. Clarke in Hooker's "Flora of British India" and elsewhere the genera *Pycreus* and *Cyperus* are being kept distinct for the present as a matter of convenience, although it is realized that *Pycreus* is polyphyletic, its species having been derived from various sections of the genus *Cyperus*, by reduction of the trigonous nut and 3-fid style to a laterally compressed biconvex nut and 2-fid style. Similarly the genus *Juncellus* is composed of species derived from several different sections of *Cyperus* by reduction to a dorsally compressed nut and 2-fid style. It is therefore acknowledged that these genera are, in one sense, artificial. On the other hand they are convenient, definitely delimited and therefore easily determined. If they are not accepted the species belonging to them have all to be reduced to the already unwieldly genus *Cyperus*, or a fresh generic classification of the *Cyperaceae* has to be evolved. It is probable that this last suggestion will eventually yield a working classification in accord with phylogenetic principles but for the present it is impracticable. It is to be further noted that a reduction of *Pycreus* and *Juncellus* to *Cyperus* logically implies other reductions. *Mariscus* must be sunk in *Kyllinga*, or both genera in *Cyperus*. *Courtoisia* and *Torulinium* also become involved and the final result is the reduction of all the genera of the tribe *Eucypereae* to the one genus *Cyperus*. Lastly, it appears to the writer to be no improvement to reduce some or all of the above mentioned genera to *Cyperus* and to keep them as "Sections" within this genus. This course is followed, for example, by Pax in Engler and Prantl "Die Natürlichen Pflanzenfamilien" ii. 2., and implied by the arrangement of species in Britton, "Sedges of Jamaica" and Cooke "Flora of Bombay."

The genus *Pycreus* was established by Beauvois in Fl. Owar. ii., p. 48. (1807) and the species *Pycreus polystachyos* is well figured at tab. 86. and being the only species mentioned by name is to be considered the type of the genus. To the genus *Pycreus* Nees in 1835 (in Linnaea ix, p. 283) transferred without comment a number of species previously placed in *Cyperus* and amongst these was *Cyperus pumilus*. This name was first used by Linnaeus (Linn. Amoen. Acad. iv, p. 302, 1759 and Sp. Pl. ed. 2. p. 69, 1762) to designate a small Indian species. The description and a reference to a figure of Plukenet's (Pluk. alm. 179. t. 191. f. 8.) leave no doubt as to the plant intended. The Linnean Herbarium contains one sheet written up in Linnaeus's hand-writing "*Cyperus pumilus.*" On this sheet one original specimen, pasted down, is the plant represented by Plukenet (l. c.) and the plant generally accepted as *C. pumilus*, Linn. A second fragment added later with a pencil note "Hort. Fothergill 1778 Fairbairn J.E.S." is *Cyperus flavescens*, L. What Linnaeus intended by *Cyperus pumilus* is therefore clear and *pumilus* is the earliest specific name for the species, which, according to the Vienna Rules, must on transference to *Pycreus* become known as *Pycreus pumilus*. Nees, in 1835, as mentioned

above, made this combination but although he then quoted no specimens or synonyms his previous reference in Wight, Contributions to the Botany of India (1834), p. 74, shows that the plant which he understood as *Cyperus pumilus* was not the species of Linnaeus but a species for which the combination *Pycreus hyalinus* (Vahl), Turrill, has to be made. In other words the transference was associated with specimens belonging to another species. This being so it seems advisable, logical and in accordance with established rules to remake the combination *Pycreus pumilus* as *Pycreus pumilus*, Turrill, non Nees, intending thereby the true *Cyperus pumilus*, L. non Nees. C. B. Clarke in the Flora of British India and numerous other works on the *Cyperaceae* has accepted the combination *Pycreus pumilus*, Nees (non *Cyperus pumilus* L.), not for our plant but for a species whose history we have yet to trace.

In 1789 Retzius (Obs. v. p. 13.) described *Cyperus nitens*, a species which was accepted by Vahl (Enum. Plant. ii. p. 329.). Exactly what plant was intended is doubtful but probably *Pycreus pumilus*, Turrill (*Cyperus pumilus*, L.), was meant, certainly this interpretation has been the one generally accepted by specialists. Nees in 1843 (Nov. Act. Acad. C.L.C. Nat. Cur. xix., Suppl. 1, 53) transferring *Cyperus nitens*, Retz to *Pycreus*, gives a description which certainly applies to *Pycreus pumilus*, Turrill, non Nees. This name *Pycreus nitens*, Nees, is the one used by C. B. Clarke in the majority of his works. The same species was described by Nees and Meyen as *Cyperus pulvinatus*, in Wight, Contributions to the Botany of India, 1834, p. 74, and this was transferred to *Pycreus* by Nees in Linnaea ix. 1834, p. 283. Hence in *Kew Bull. Addit. Ser.* viii. p. 94. the name *Pycreus pulvinatus*, Nees, is accepted by Clarke.

In 1806 Vahl (Enum. Plant. ii. p. 329), published under the name of *Cyperus hyalinus*, a quite distinct species which has been frequently confused, as by Nees, with *Pycreus pumilus*, Turrill, (*Cyperus pumilus*, L.). This is apparently the earliest trivial for the species recorded in C. B. Clarke's works as *Pycreus pumilus*, Nees, and a new combination—*Pycreus hyalinus*, Turrill, has to be made in accord with the Vienna Rules, since the plant is undoubtedly a *Pycreus*; as the genus is accepted here.

It will be well finally to sum up the chief synonymy involved in the unfortunate confusion which is unravelled above:

Pycreus pumilus, *Turrill*, non Nees. *Cyperus pumilus*, L., Amoen. Acad. iv. (1788) p. 302, et Sp. Pl. ed. 2. p. 69 et herb. propr. *Cyperus nitens*, Retz., Obs. v. (1789) p. 13? *Cyperus pulvinatus*, Nees et Meyen in Wight Contrib. (1834), p. 74. *Pycreus pulvinatus*, Nees, in Linnaea ix. (1834), p. 283. *Pycreus nitens*, Nees, l. c., and C. B. Clarke in Fl. Brit. India vi. p. 591.

Pycreus hyalinus, *Turrill*. *Cyperus hyalinus*, Vahl, Enum. ii. (1806) p. 329. *Cyperus pumilus*, Nees in Wight Contrib. (1834). p. 74 excl. syn., non Linn. *Pycreus pumilus*, Nees, in Linnaea ix. (1834) p. 283, and C. B. Clarke in Fl. Brit. India vi. p. 591.

XX.—MISCELLANEOUS NOTES.

Mr. A. J. Thornton, a member of the gardening staff of the Royal Botanic Gardens, Kew, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Assistant Superintendent of the Botanical and Forestry Department, Hong Kong.

John Firminger Duthie.—On the 23rd February last there died at West Worthing, Sussex, one of the oldest of the correspondents of Kew. For some years he had been in poor health so that his visits had not been so frequent as formerly. But he had always been held in great regard by the Staff and frequenters of the Herbarium, and the news of his death was received by them with great sorrow and regret.

J. F. Duthie was born on the 12th May, 1845, the son of the Rev. A. H. Duthie, Rector successively of Sittingbourne and Deal. He was educated at Marlborough College and at Jesus College, Cambridge, where he took the B.A. degree in 1867 with a 3rd class in the Natural Science Tripos. After leaving College he spent some time as a tutor in Somersetshire and then travelled with his mother and sister in Italy, living chiefly at Florence. He collected specimens largely, both in Italy and also in the islands of Malta and Gozo, and he published, chiefly in the "Journal of Botany," accounts of the Flora of those islands and of that of Tuscany and Monte Generoso in the Italian Lake country. It was a most unfortunate circumstance that all his valuable collections made at the time were lost in a fire at a repository in Scotland where they had been stored. He was then, for a time, Professor of Natural History at the Royal Agricultural College at Cirencester, and in 1875 he was elected a Fellow of the Linnean Society.

In 1876 Duthie was offered by Lord Salisbury, then Secretary of State for India, and accepted, the post of Superintendent of the Botanic Garden at Saharanpur in the North-Western Provinces of India, vacant by the retirement of Dr. W. Jameson. In those days the Garden of Saharanpur was for the Upper Gangetic Plain what that at Calcutta was for the Lower country and the regions bordering the Bay of Bengal, and Duthie at once set to work to carry on the labours of distinguished predecessors like Doctors Royle, Falconer, King and Jameson. He spent 27 years in that appointment, retiring in 1903, and during his service he travelled over nearly the whole of the North-Western Provinces, the Punjab and Central Provinces, and especially explored the Himalayan regions of Kumaon (with Mr. J. R. Reid), Garhwal, Simla and Kashmir, making everywhere large and well preserved collections not only for the enrichment of the Herbarium at Saharanpur, but for distribution to Kew, the British Museum, Edinburgh, Calcutta and elsewhere and to private friends.

Among other important journeys he was attached to the Staff of the General Commanding in the "Black Mountain" Campaign of 1888 and greatly prized the medal he had earned under fire. He paid special attention to the grasses of Northern India, and his list of them was published at Roorkee in 1883 and 1886. He also, as might have been expected from his work in the Saharanpur Garden, where so much was done in cultivating for seed and for improved varieties the edible vegetables of India, published in 3 Parts in 1882–93, partly in conjunction with Mr. J. B. (now Sir J. Bampfylde) Fuller, a full account, with plates, of the Field and Garden Crops of the North-Western Provinces. His tours produced also many papers on the Floras of the regions visited by himself or by those who sent their collections to Saharanpur from Kashmir, Merwara, Kumaon, Chitral, &c.

In addition to his work at Saharanpur, he lectured every year on the Systematic Botany of India at the Forest School at Dehra Dun and usually accompanied the students on their annual tour in the Hills of Jaunsar and Tehri-Garhwal, where the Forests were under the management of the Government. He also paid a yearly visit to Calcutta, where he spent a fortnight of strenuous work in the Herbarium, and Sir George King and his successor held his work in very high esteem.

On his retirement in 1903 he returned to England, and in September of that year was appointed Assistant for India in the Herbarium at Kew, a post which he held till obliged to relinquish it, owing to illness, in April, 1907. During his time at Kew, his wide knowledge of Indian plants was always at the disposal of those who were working on them and he described and published in the Kew Bulletin, the Botanical Magazine, the Gardeners' Chronicle and elsewhere many important new species sent from India and the neighbouring regions. At the request of Sir Richard Strachey he revised the list of the great collection of the plants of Kumaon and neighbouring Himalayan regions known as the "Strachey and Winterbottom" collection, the first edition of which was published in 1882, and the new revision issued in 1906. On receiving a copy of it Sir Joseph Hooker wrote to him "I am rejoicing over the 'Strachey and Winterbottom Kumaon plants' which is doubly important as showing what a marvellous collection they made in one season and as being an up-to-date catalogue of Kumaon plants. It appears to me to have been very carefully compiled by you."

He also commenced and carried on from 1903 onwards, the "Flora of the Upper Gangetic Plain," which he was able before his death to see very near completion, and it is hoped that arrangements will shortly be made to publish the final part. The work was, in late years, very sadly hampered by failing health.

Duthie married in 1879 Miss Coape-Smith, daughter of Col. Coape-Smith, then in charge of the Army Remount Establishment at Saharanpur, and we are indebted to Mrs. Duthie for kindly

providing much information about him. He leaves two children: Lt.-Col. A. M. Duthie, D.S.O., Lég. d'Honneur, O.B.E., now Commanding the Artillery School at Quetta, and Mrs. W. H. Norman, wife of Col. W. H. Norman, C.B., D.S.O., now on the Staff in India.

During the whole of his service in India, Duthie was in constant and regular correspondence with Sir Joseph Hooker The originals of Sir Joseph's letters to him were presented by him before his death to the Kew Library and many of them were quoted or otherwise referred to in the Life of Sir Joseph Hooker prepared by Mr. Leonard Huxley and published by Lady Hooker. They show well how much Sir Joseph appreciated Duthie's work and the warm regard he always felt for him.

Duthie was a slow worker and very cautious, so that he was often unable quickly to make up his mind on systematic questions, but he always came to a decision in the end and the result was the more valuable in consequence. He was always extremely anxious to avoid inaccuracy and used to polish up his work and descriptions over and over again in order to make sure that they were quite right. The most unassuming of men, he never put himself forward in the least, leaving it to his friends to estimate the value of what he did. He was a delightful travelling companion and an excellent climber, and many Indian Forest Officers and other friends will long remember the kindly, good-natured botanist who accompanied them on their marches over the plains or mountains of Northern India. They will all hear of his death with great regret.

J. S. Gamble.

List of works by the late Mr. J. F. Duthie, B.A., F.L.S.

Polygala austriaca, Crantz., in Kent. Journ. Bot. ix. 1871, p. 212.

Notes on the flora of Malta & Gozo. Journ. Bot. i. 1872, pp. 206–210.

Notes on Monte Generoso (Italian Alps) and its Flora, from observations made during a visit of three months at the Hotel de Generoso in 1872. Edinb. Bot. Soc. Trans. xi. 1873, pp. 483–489.

Additional species and new localities for the flora of Tuscany. Journ. Bot. iii. 1874, pp. 49–53.

On the botany of the Maltese Islands in 1874. Parts i. & ii., Journ. Bot. iii. 1874, pp. 321–326; iv. 1875, pp. 36–42.

Dehiscence of *Collomia grandiflora*. Nature xii. 1875, pp. 494–495.

Botanical excursions in the neighbourhood of the baths of Lucca during the summer of 1873 [1874]. Edinb. Bot. Soc. Trans. xii. 1876, pp. 66–84.

Myrtaceae in the Flora of British India. ii. 1879, pp. 462–506.

List of North-west Indian Plants. Roorkee, 1881.

Duthie, J. F., & Joseph Bampfylde Fuller. Field and Garden Crops of the north-western provinces and Oudh. Pts. i–iii. 1882–93.

A list of the grasses of North-western India, indigenous and cultivated. (Dept. Agric. N.W. Prov.) Roorkee, 1883.

Notes on vegetable products of the Saharanpur and Dehra Dun districts, N.W. India. Journ. Bot. xxi. 1883, pp. 178–181, 325–326.

Report on an examination of the indigenous grasses and other fodder-yielding plants growing on the Hissar Bir land [Punjab] 1885. fol.

Report on the Government Bot. Gardens of Saharanpur and Mussoorie . . . . 1885(–86). Allahabad 1885 [–86] fol.
Illustrations of the indigenous fodder grasses of the plains of North-western India. Roorkee, 1886. fol.
Report on a Botanical Tour in Merwara (Rajputana), etc. Calcutta, 1886.
Kumaun. Gard. Chron., xxv. 1886, pp. 276–277, 299, 371–372, 456–458.
The fodder grasses of Northern India. Roorkee, 1888.
Periodical flowering of *Strobilanthes spp.*, and of *Aechmanthera tomentosa*, Nees. Bombay Nat. Hist. Soc. Journ., v. 1890, pp. 417–418.
Report on a botanical tour in Kashmir, 1892. Bot. Surv. India Records, i. n.l, 1893, pp. 1–18.
Report on a botanical tour in Kashmir, 1893. Bot. Surv. India Records, i. n. 2, 1894, pp. 25–47 (with maps).
The Botany of the Chitral Relief Expedition, 1895. Bot. Surv. India Records, i. n. 9. 1898, pp. 139–181 (with maps).
On *Afridia*, a new genus of *Labiatae* from the north-west frontier of India. [1898.] Bombay Nat. Hist. Soc. Journ., xi. 1897–98, pp. 696–697.
Description of a new *Androscae*. From the north-western Himalaya. [1899] Bombay Nat. Hist. Soc. Journ., xii. 1898–1900, p. 675.
Alcock, Alfred William. Report on the natural history results of the Pamir Boundary Commission, with a list of the plants by J. F. Duthie. Calcutta, 1898. fol.
King, Sir George, J. F. Duthie and D. Prain. A second century of new and rare Indian plants. Ann. Roy. Bot. Gard. Calcutta, ix. pt. 1, 1901, pp. 1–77, 93 pls.
Description of some new species of *Orchideae* from N.W. and Central India. Journ. As. Soc. Beng. lxxi. pt. 2, 1902, pp. 37–45.
Ann. Rpt. of Director Bot. Dept. Northern India for year 1901–02. Rep. Bot. Surv. Ind. 1902, pp. 3–5.
Flora of the Upper Gangetic Plain and of the adjacent Siwalik and Sub-Himalayan tracts.
Vol. i. *Ranunculaceae* to *Campanulaceae*. 1905.
Vol. ii. *Plumbaginaceae* to *Plantaginaceae*. 1911.
Vol. iii. Pt. 1. *Nyctaginaceae* to *Ceratophyllaceae*. 1915.
Pt. 2. *Coniferae* to *Juncaceae*. 1920.
Pt. 3. *Palmae* to *Naiadaceae*. 1922.
Rosa sorbifolia, Focke [identical with *R. microcarpa*]. Gard. Chron., Ser. 3, xxxviii. 1905, p. 266.
Primula ovalifolia, Franchet. Gard. Chron. Ser. 3, xxxviii. 1905, p. 62 and pl.
Deutzia Wilsoni, sp. nov. Bot. Mag. cxxxii. 1906, t. 8083.
Orchids of the North-western Himalaya. Ann. Roy. Bot. Gard. Calcutta, ix. pt. 2. 1906, pp. 85–206, 58 pls.
Geranium platyanthum, n. sp. Gard. Chron. Ser. 3, xxxix. 1906, p. 52.
Primula deflexa, n. sp. Gard. Chron. Ser. 3, xxxix. 1906, p. 229.
Primula cognata, n. sp. Gard. Chron. Ser. 3, xxxix. 1906, p. 358.
New species of *Deutzia*. Gard. Chron. Ser. 3, xl. 1906, p. 238.
New species of *Nepeta*. Gard. Chron. Ser. 3, xl. 1906, p. 334.
Strachey, Sir Richard and J. F. Duthie. Catalogue of the plants of Kumaon and of the adjacent portions of Garhwal and Tibet, based on the collections made by Strachey and Winterbottom during the years 1846 to 1849, and on the catalogue originally prepared in 1852 . . . revised and supplemented by J. F. D. 1906.
Indian trees [A review of Sir D. Brandis's work]. Nature, lxxv. 1907, pp. 385–386.

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